Research Report

Evaluation of Obstetric Emergency Referral Cases at Dr. Cipto Mangunkusumo Hospital January - December 2008

Evaluasi Kasus Rujukan Kegawatdaruratan Obstetri di Rumah Sakit Dr. Cipto Mangunkusumo Januari - Desember 2008

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Abstract

Objective: To have description and evaluation about obstetric emergency referral cases at obstetric emergency room of Dr. Cipto Mangunkusumo Hospital (RSCM) from January until December 2008.

Method: This is a cross-sectional descriptive-analytic study with 458 secondary data samples from simple random sampling performed to all obstetric referral cases at obstetric emergency room of RSCM from January until December 2008. The data were pro-cessed for frequencies and bivariate analysis, and then further analyzed with multivariate analysis.

Results: Patients' age varied between 16 to 47 years old (27.78 ± 6.51). Grandemultiparous women had 51.9% morbidity/mortality (p = 0.024). Midwives were the majority of referee (73.1%), but 71.1% main obstetric emergency cases were referred by Ob/Gyn. There were 260 cases corresponded to main obstetric emergency with 88 cases diagnosed as hypertension. Most of the cases were referred due to threatened preterm labor (22.5%), with 74.7% reasons for referral were 'lack of facility'. Most of the cases had no complete referral record (91% cases had no referral time and 12.4% cases had no initial assessment). Our hospital's mean response time was 8 minutes. From multivariate analysis, referee (OR for doctors and Obstetricians 2.751; 95% CI 1.475 - 5.129) and delivery method (OR for spontaneous delivery 0.412; 95% CI 0.227 - 0.750) were two most influent variables for obstetric emergency referral cases outcome. The MMR for this study was 253.2/100.000.

Conclusion: Our referral system is still not efficient. It needs improvement and continuous input and facility fulfillment.

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Keywords: referral system, maternal mortality ratio, referral time, response time

Abstrak

***Tujuan**: Mendapatkan gambaran dan melakukan evaluasi kasus-kasus rujukan kegawatdaruratan obstetri di Instalasi Gawat Darurat (IGD) Lantai III Rumah Sakit Dr. Cipto Mangunkusumo (RSCM) dari Januari hingga Desember 2008.*

***Metode**: Penelitian ini berdesain deskriptif-analitik potong lintang dengan 458 sampel data sekunder yang diambil secara simple random sampling dari seluruh kasus rujukan kegawatdaruratan obstetri di IGD Lantai III RSCM dari Januari hingga Desember 2008. Data diolah secara univariat, bivariat, maupun multivariat.*

***Hasil**: Usia pasien antara 16 - 47 tahun (27,78 ± 6,51). Grandemultipara mengalami morbiditas/mortalitas sebanyak 51,9% (p = 0,024). Bidan menjadi perujuk terbanyak (73,1%), namun 71,1% diagnosis kegawatdaruratan obstetri utama berasal dari SpOG. Kedaruratan obstetri utama meliputi 260 kasus dengan 88 kasus di antaranya adalah hipertensi/preeklampsia/eklampsia. Mayoritas kasus yang dirujuk adalah ancaman persalinan preterm (22,5%), dengan kurangnya fasilitas menjadi alasan merujuk terbanyak (74,7%). Sebagian besar kasus tidak disertai pencatatan surat rujukan yang lengkap (91% kasus tidak mencantumkan waktu merujuk dan 12,4% kasus tidak ada penilaian awal). Rerata waktu respons RSCM 8 menit. Dari hasil analisis multivariat, kualifikasi perujuk (RO untuk dokter/Spesialis Obstetri dan Ginekologi 2,751; 95% IK 1,475 - 5,129) dan cara persalinan (RO untuk persalinan spontan 0,412; 95% IK 0,227 - 0,750) adalah variabel yang dianggap paling berpengaruh pada luaran kasus rujukan kedaruratan obstetri. Rasio Kematian Maternal pada penelitian ini 253,2/ 100.000.*

***Kesimpulan**: Sistem rujukan di wilayah RSCM belum efisien. Dibutuhkan perbaikan dan evaluasi berkesinambungan tentang sistem maupun kelengkapan fasilitas.*

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***Kata kunci**: sistem rujukan, angka kematian ibu, waktu rujuk, waktu respons*

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INTRODUCTION

Worldwide, it is estimated 529,000 women died due to pregnancy and labor complications, and one woman die each minute.[1] Indonesia is one of the country that is still struggling to decrease maternal mortality rate (MMR). Indonesia's MMR does not show significant decrease within 15 years, which the number supposed to reach 225 on year 2000.[2] We now facing the target of 112 for MMR and 20 for neonatal mortality ratio by the year 2015 according to *Millenium Development Goals* (MDGs).[2]

Unicef (1991) found out that primary health care only able to reduce mortality rate about 20%. On the contrary, effective referral system could reduce it about 80%. It is also revealed that due to many delays, 80% of maternal death happened in referral hospitals.[3]

From January to December 2007, there were 5,500 referral cases admitted to obstetric emergency room at Dr. Cipto Mangunkusumo Hospital (79.8% from

overall cases), and 30.1% of the case were delivered vaginally, either spontaneously or by operative vaginal delivery. There were 15 maternal mortality cases (0.2%), either by direct or indirect causes.[4]

The aim of this study is to have description and evaluation about emergency obstetric cases admitted and treated in emergency obstetric room at Dr. Cipto Mangunkusumo Hospital (RSCM). We also want to see any connection between patient's demographic factors, type of illnesses, referree's demographic factors, referral proccess and cases outcome. The results of this study hopefully can give input for obstetric referral system particularly in Jakarta.

This study evaluate obstetric emergency cases management in particular, with patient's education level, referrer's qualifications, referrer's facilities, type of illnesses, time needed to refer the patient to RSCM, and hospital response time assumed as the most influencing factors.

METHOD

This was a descriptive-analytic, cross-sectional study using secondary data from 458 medical records of obstetric referral cases admitted to obstetric emergency room of Dr. Cipto Mangunkusumo Hospital from January to December 2008. A simple random sampling were performed to obtain data samples. The exclusion criteria was death on arrival referral cases. From each medical record, patient's demographic data, referrer's demographic data, reason for referral, time needed to refer patient to RSCM, hospital response time, and the outcome were noted in secondary data form for editing and coding. All data were statistically analyzed with SPSS 13.0. The data were processed for frequencies and bivariate analysis (categorical data were analyzed using chi square or Fisher Exact Test, and interval data were analyzed using t-test), and then further analyzed with multivariate analysis with logistic regression for all bivariate analysis results with $p < 0.25$. The independent variable in this study was the cases' outcome with value of α was 5% and $p < 0.05$.

RESULTS

From RSCM Emergency Obstetric Room Activity Report 2008, there were 3,362 referral cases (63.28% from all cases). As many as 3,205 cases (95.3%) had pregnancy terminations, 1,208 of them by abdominally (37.69%). There were 13 maternal mortality cases, so that hospital's maternal mortality ratio is 406/100,000 live birth.

The characteristics of patients, pregnancies, referrers, and cases from 458 sample cases taken were listed in Table 1. Mean age of the patients was 27 (16 - 47) years old. Majority of patients' education level were senior high (51.5%) and have good antenatal service (79.3%). Mean parity of the patients was 2 (1 - 9).

Midwives referred 73.4% cases, while Obstetricians only 9.6% cases. About 47.8% cases were referred directly from primary health care. Central Jakarta was the origin of 34.7% cases, followed by East Jakarta and South Jakarta (24.2% and 20.5% respectively). There were also cases from outside Jakarta like Bekasi, Depok, Bogor, and Tangerang (38, 5, 3, and 2 cases respectively).

As many as 260 cases (56.8%) were included in five main causes of maternal mortality,[5] which were hypertension in pregnancy (88 cases), antepartum hemorrhage (59 cases), obstructed labor (48 cases), postpartum hemorrhage (33 cases), and infection (16 cases). Nevertheless, the most case to be referred was threatened preterm labor (103 cases or 22.5%). Most of main emergency obstetric cases were Obstetricians' referral (37 cases or 71.1%).

Table 1. The characteristics of patients, pregnancies, referrers, and cases.

Patients' Demographic Characteristics	n	%
Age (year):		
< 20	32	7.0
20 - 29	253	55.2
30 - 39	148	32.3
≥ 40	25	5.5
Total	458	100.0
Education level:		
> Senior high	28	6.1
Senior high level	236	51.5
Junior high level	99	21.6
Elementary level	94	20.5
Uneducated	1	0.2
Total	458	100.0
Job:		
Government employee	3	0.7
Private employee	14	3.1
Housewife	438	95.6
Self employee	2	0.4
Student	1	0.2
Total	458	100.0

Pregnancy Characteristics	n	%
Parity:		
Nulliparous	201	43.9
Multiparous	221	48.3
Grandemultiparous	36	7.9
Total	458	100.0
Antenatal visit (time):		
≥ 4	363	79.3
< 4	83	18.1
Never	12	2.6
Total	458	100.0

Referrers' Characteristics	n	%
Qualification:		
Obstetrician	45	9.8
General Practitioner	78	17.0
Midwife	335	73.1
Total	458	100.0
Facility:		
Hospital	105	22.9
Primary health care	219	47.8
Maternity clinic	62	13.5
Private practice	72	15.7
Total	458	100.0
Origin:		
Jakarta	410	89.5
Outside Jakarta	48	10.5
Total	458	100.0

Cases Characteristics	n	%
Diagnosis:		
Main obstetric emergencies	260	56.8
Other obstetric emergencies	184	40.2
None referral diagnosis	14	3.0
Total	458	100.0
Consciousness:		
Compos mentis	398	99.3
Decrease consciousness	3	0.7
Total	401	100.0
Reason for referral:		
Facility	342	74.7
Human resource	19	4.1
Finance	2	0.4
Full capacity	27	5.9
Other	4	0.9
None reason	64	14.0
Total	458	100.0

Initial assessment performed by the referrer and the time needed to refer patient to referral hospital were considered to have strong influence to the outcome, and the results about them were stated in Table 2 and 3.

Table 2. Cases Distribution according to Referral Process.

Referral Process	n	%
Initial assessment:		
Stated	401	87.6
None	57	12.4
Total	458	100.0
Referral time needed:		
< 1 hour	13	2.8
≥ 1 hour	28	6.1
None stated	417	91.0
Total	458	100.0

Table 3. Mean Referral Time and Mean Response Time.

	Mean	SD
Referral time	1:53	± 2:04
Response time	0:08	± 0:22

It is too bad because 91% referrer did not state the referral time, so that the rapidity of referral which at first were considered to be the main factor that influence the outcome cannot be analyzed further. From 41 cases which the referral time were stated, only 31.7% cases were referred less than 1 hour, and the mean referral time is 1 hour 53 minutes (0:03 - 12:00).

All emergency obstetric cases must have been responded within 10 minutes[6], but only 72.9% cases had response time within 10 minutes. Mean hospital's response time was 8 minutes (0:00 - 4:07). Only 41.7% cases need emergent cessation of pregnancy, and spontaneous vaginal delivery was the method of choice (66.4%). Emergent C-section only performed to 28.3% of cases. The forceps and vacuum extractions were performed to 9 cases and 7 cases respectively. It is also noted that there were 3 cases underwent hysterectomies, 1 case of artery ligation, and 1 case underwent B-Lynch stitching technique. For overall cases management in RSCM can be seen in Table 4.

Table 4. Cases Distribution according to Hospital's Management.

Management	n	%
Management:		
Cessation of pregnancy	191	41.7
Expectative	134	29.3
Conservative	93	20.3
Other	40	8.7
Total	458	100.0
Delivery method:		
Spontaneous	202	66.4
Forceps extraction	9	3.0
Vacuum extraction	7	2.3
Abdominally	86	28.3
Total	304	100.0
Duration of admission (day):		
≤ 3	377	82.4
> 3	81	17.6
Total	458	100.0
Transfusion:		
No	420	91.7
Yes	38	8.3
Total	458	100.0

The referral cases' outcomes were stated in Table 5. There was 1 mortality case, so that the maternal mortality ratio in this study was 253.2/100,000 live birth. Interestingly there were 103 (22.5%) patients who were discharged from RSCM by their own will.

Table 5. Cases' Outcomes Distribution.

Outcome	n	%
Good	282	61.6
Morbidity	72	15.7
Mortality	1	0.3

From descriptive data, some of it had extreme distribution and lack of number so statistical analysis

cannot be performed. From all factors considered to influence the outcome, referral time cannot be analyzed further due to lack of number. Further more, the only mortality case was merged with the morbidity cases for further statistic evaluation.

From bivariate analysis, 7 data groups had significant correlation with cases' outcome ($p < 0.25$) and were analyzed further with logistic regression multivariate analysis. Those 7 groups were: parity, patient's educational level, referrer's facility, referrer's qualification, hospital's management of choice, mode of delivery, and duration of admission.

Grandemultiparous women had the highest morbidity/mortality compared to nulliparous and multiparous women (51.9% vs 25.4% and 26.7% respectively, $p = 0.010$). Low education level (elementary and uneducated women) also had the highest morbidity/mortality compared to other educational level (33.7%, $p = 0.123$).

Interestingly, the highest morbidity/mortality rate found from Obstetricians referral cases (50%) compared to general practitioners (GP) (35.5%) and midwives (23.3%), with $p = 0.001$.

No significant difference in outcome between cases with response time within 10 minutes and those which exceed 10 minutes. There could be other factors influence the outcome other than response time.

Direct cessation of pergnancy's contributed lowest morbidity/mortality rate in hospital management's group, while other managements such as placenta manual, curretage, artery ligation, B-Lynch stiching and hysterectomy had the highest morbidity/mortality (28% vs 48.5%, $p = 0.000$). Vaginal deliveries had significantly lowest morbidity/mortality compared to abdominal deliveries 14.6% vs 40.8%). The longer the duration of admission, the higher the morbidity/mortality rate (1.85 ± 0.876 vs 4.03 ± 2.556, $p = 0.000$).

Mode of delivery had the most powerful relation with outcome with $p = 0.000$ (Odds Ratio for spontaneous delivery to have good outcome was 2.881; 95% CI 1.615 - 5.140), followed by hospital's plan for management with $p = 0.000$ (OR for termination/expectative management to have good outcome was 2.795; 95% CI 1.748 - 4.467), referrer's qualification with $p = 0.001$ (OR for Obstetricians and General Practitioners to have good outcome was 0.437; 95% CI 0.270 - 0.707), and referrer's facility with $p = 0.071$ (OR for primary health care to have good outcome was 1.537; 95% CI 0.983 - 2.404).

Logistic regression multivariate analysis were performed to variables with $p < 0.25$ in bivariate analysis to see how significant the connection between variables really were. It appeared that referrer's qualification and mode of delivery were the 2 most influencing variables to the cases' outcome, with OR for Obstetricians and GP to have morbidity/mortality 2.751 (95% CI 1.475 - 5.129) and OR for spontaneous delivery to have morbidity/mortality 0.412 (95% CI 0.227 - 0.750), and the equation revealed from logistic regression multivariate analysis was:

$$y = -1.104 + 1.012\ (\text{referrer's qualification}) + [-0.886](\text{mode of delivery})$$

DISCUSSION

Until today, RSCM does not have specific records for emergency obstetric referral cases. Since this study is a descriptive-analytical study, it can be used as basic data for further studies. Cross-sectional design was chosen to avoid variable homogenization as a way in reducing bias, so that data can be obtained as many as this study can. Nevertheless, this design has weaker significance value when compared to cohort or case-control study. This study also more likely to have many biases, since factors affected morbidity/mortality were very complex. Therefore, logistic regression multivariate analysis was the method chosen to reduce those biases.

Dr. Cipto Mangunkusumo Hospital had large numbers of emergency obstetric referral cases (3.362 cases) compared to other referral center like RSUP dr. Karyadi Semarang (1.048 cases in the year 1999).[6] The maternal mortality ratio of 406/100,000 live birth, is far higher than national maternal mortality ratio, which was 228/100,000 live birth (Indonesian Demographic Health Survey (IDHS) 2007).[7] Consider that RSCM is a national referral center, the severity of case could have influence in this result.

Patients above 35 years and below 20 years of age had the highest morbidity/mortality compared to other age groups (29.8% vs 29.6%, $p = 0.965$). Morbidity/mortality rate increase as the parity increase, with the highest rate was found in grandemultiparous women. This fact was consistent with '4 too' that associated with 65% high risk pregnancy too young (less than 20 years old), too old (more than 35 years old), too many (more than 3 children, and too close (less than 2 years of age).[8] Family planning is still a relevant factor in reducing maternal morbidity/mortality.

Patient's low education level may have association with quantity and quality of antenatal care, parity, patient's age when giving birth, and referral rapidity which can lead to high maternal morbidity/mortality. Study about those associations can be further proposed.

Midwives as the highest referrers compared to other qualification corresponded with other studies performed by Pratomo at dr. Karyadi Hospital in Semarang[7] (63.6% referral cases (highest) came from midwives and 6.9% cases (lowest) were referred by Obstetricians), Nasution at Tanjungpura Hospital[9] (midwives' referral cases 89.5%) and Tobing at Pirngadi Hospital and Adam Malik Hospital[10] (20% cases from midwives vs 4.21% cases from obstetricians). However, the highest morbidity/mortality came from obstetricians referral cases ($p = 0.001$). It is thought that patients referred by higher referrer's qualification had higher degree of severity of the illness, so that the morbidity/mortality rate became prominent. Obstetricians' referral cases also had small 'false referral' numbers since 71.1% of them were the main obs-tetric emergency cases. Good communication between the lower health provider's qualifications to the one above can increase referral system efficiency and minimize 'false referral'.

Different result shown by study conducted in Kabupaten Asahan and Kabupaten Langkat, North Sumatra at year 2002, where most of maternal mortality

happened to referral cases from midwives or traditional birth attendants. This difference may be due to type of illnesses, geographic difficulty, and limited resources, since this study was conducted in C-class hospital. There was no horizontal referral in the study.[9]

In West Africa, the highest maternal mortality occurred in rural areas where access to emergency obstetric care restricted by wide geographic distance.[11] RSCM was located in downtown Jakarta, therefore distance and transportation should not be a matter. Nevertheless, some obstetric emergency cases were referred from outside Jakarta, especially form satellite areas like Bekasi, Depok, Tangerang, and Bogor. No case from other city/island was taken as sample in this study. There were 31.7% morbidity/mortality in cases referred from outside Jakarta, but there was no statistical difference. The duration of time needed for referral was considered to be more influential than the distance, although off course distance could affect the duration of time.

Between main obstetric emergency cases, hypertension in pregnancy (including preeclampsia/eclampsia) was the leading referral cases. It was different from two other studies where obstructed labor became the main emergency referral diagnostic.[6,9] In RSCM, the leading diagnosis was threatened preterm labor, with lack of facility as the main reason. Reevaluation and - if necessary - addition of facilities in network hospitals, especially for small neonates care, so that RSCM as a tertiary hospital could concentrate more in cases that required more intensive management. Moreover, the quality of preterm care in RSCM must be enhanced. Another study focusing about threatened preterm labor is needed to understand actual root of the problem, so the best solution can be deliberated and the referral system could run more efficiently.

No statistical difference form outcomes between main obstetric emergency referral cases and other obstetric referral cases. It means a proper management in any emergency obstetric case should give no significant difference in outcome.

Lack of facility as the main reason for referral was equivalent to 'the referrer was improper to manage the case' stated by Pratomo in his study (86.6%),[6] because that reason was most declared by primary health care which had neither operating room, intensive care unit, nor perinatology. Interestingly in this study, 'fully occupied' (27 cases) and 'limited fund' (2 cases) as the reason for referral, emerged - as it cannot be found in other studies. Further study needed to evaluate occupation capacity in network hospitals to anticipate unnecessary referral. Health funding socialization is also important to maintain the efficiency of referral system.

Most of the cases had no data about the referral duration, and 12.4% cases had no initial assessment. It illustrated the lack of recording process in referral system. Recording process in referral system is vital for further management in obstetric emergency case.[3] Specific prospective cohort study is needed to evaluate the relation between referral process and outcome of obstetric emergency referral cases. That kind of study allows the initial data completely taken, including the length of time needed to refer, means of transportation used, and management during the referral. There was 1 emergency obstetric case that took 12 hours to arrive to RSCM. This was inappropriate according to Obstetric and Neonatal Care Regionalization system, where it was stated that hospital's coverage areas should be reachable within less than 1 hour in order to provide emergency management according to the standard.[12] Standard of time used in this study was different from other studies where Pratomo[6] used the standard of 2 hours and Nasution[9] divided it into under 30 minutes, between 31 - 120 minutes, and above 120 minutes with highest maternal mortality in the 31 - 120 minutes group.

Hospital's mean response time was 8 minutes, but only 72.9% cases had response time 10 minutes or less. In RSCM, every emergency case admitted was handled first by triage team. Every case that needs hemodynamic resuscitation would be managed first in the resuscitation room before it was sent to obstetric emergency room. In this study, response time was measured between the times stated in the triage form to the time stated in the obstetric status. It could explain some of the cases that had long response time.

Only 28.3% cases needed emergent abdominal termination. It was inconsistent with the main reason for referral, which was lack of facility. It should be evaluated further about obstetric case management in primary and secondary care, to increase referral efficiency. This result was different from the study in Tanjung Pura Public Hospital and Kisaran Public Hospital where cesarean section was the majority of management (48.6%).[9] Spontaneous delivery had lower morbidity/mortality compared to other mode of delivery.

Duration of admission had positive correlation with the outcome, because it was one of morbidity criteria in this study, so it would not be discussed further.

One maternal mortality case happened to a 27 years old nulliparous woman with senior high education level. She was referred by an obstetrician from a hospital in East Jakarta. The diagnosis of referral was eclampsia, and she had decreased consciousness when she was referred. No record about duration of referral. No delay in hospital's response time. The patient was hospitalized for 16 days and had transfusions before she finally passed away.

Among the six independent variables thought to be the most influencing factors for cases' outcome, only referrer's qualification and referrer's facility had $p < 0.25$, and could be analyzed further in multivariate analysis. One variable cannot be analyzed further because data limitation. But there were other variables put into count and also be analyzed to minimize bias. From multivariate analysis, referrer's qualification was emerged to be had the strongest relation with the outcome (RO 2.751) followed by mode of delivery (RO 0.412). The equation resulted from the analysis showed how those variables interact with the dependent variable ('y' axis), which was the cases' outcome.

CONCLUSION

The referral system within RSCM coverage area is still not efficient. Further specific and better designed study needed to investigate the root of the problem in order to have better and more efficient referral system.

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